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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/719,640

11/21/2003

Terry L. Gilton

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07/26/2004

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EXAMINER

PHAM, THANHHA S

ART UNIT

PAPER NUMBER

2813

DATE MAILED: 07/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/719,640	Applicant(s) GILTON ET AL.	
	Examiner Thanhha Pham	Art Unit 2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 36-48 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 36-38 and 41-48 is/are rejected.
- 7) ☒ Claim(s) 39 and 40 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>11/21/03</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This Office Action is in responses to Applicant's Preliminary Amendment dated 11/21/03.

Status of Claims

1. Claims 1-35 were cancelled.

Claims 36-48 remain in application for consideration.

Double Patenting

2. Claim 40 is objected to under 37 CFR 1.75 as being a substantial duplicate of claim 39. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 36-38, 41, 43, 47 and 48 are rejected under 35 U.S.C. 102(b) as being anticipated by Yoshikawa et al [US 4,320,191].

➤ With respect to claim 36, Yoshikawa et al (figs 1-18 and col 1-6) discloses the claimed semiconductor processing method comprising:

forming an antireflective coating comprising Ge and Se (2, fig 14, col 5 lines 31-32: layer 2 of $\text{Se}_{75}\text{Ge}_{25}$ would have antireflective characteristic) over a substrate (1) to be patterned;

forming photoresist (3, fig 14, col 5 lines 32-34 & 1-6: the silver layer 3 forming from solution AgCN is photoresist – photosensitive material) over the antireflective coating (2);

exposing the photoresist (3, fig 15, col 5 lines 32-36 & 6-12) to actinic radiation (light 6 from Hg lamp) effective to pattern the photoresist (3), the antireflective coating (2) reducing reflection of actinic radiation during the exposing than would otherwise occur under identical conditions in the absence of the antireflective coating (see figs 14-15: the layer $\text{Se}_{75}\text{Ge}_{25}$ 2 would reduce reflection of actinic radiation during the exposure to the light 6);

after the exposing, patterning the substrate through openings in the photoresist and the antireflective coating using the photoresist and the antireflective coating as a mask (figs 15-17; the substrate (1) is s etched through openings in the photoresist and antireflective coating 21 – mixture of the photoresist 3 and the antireflective coating 2); and

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after patterning the substrate, chemically etching the photoresist and the antireflective coating substantially completely from the substrate using a single etching chemistry (figs 6-7 & 17-18, col 4 lines 38-43 and col 5 lines 43-47: the photoresist and the antireflective coating, mixture 21 of the photoresist 3 and the antireflective coating $\text{Se}_{75}\text{Ge}_{25}$, is removed by a single dry etching chemistry [col 4 lines 38-43] or a single wet etch chemistry [col 5 lines 43-45]).

- With respect to claim 37, Yoshikawa et al (col 5 lines 43-46) discloses the single etching chemistry is wet.
- With respect to claim 38, Yoshikawa et al (col 4 lines 38-43) discloses the single etch chemistry is dry.
- With respect to claim 41, Yoshikawa et al teaches the antireflective coating (2, $\text{Se}_{75}\text{Ge}_{25}$) consists essentially of Ge and Se.
- With respect to claim 43, Yoshikawa et al (col 5 lines 31-32) teaches the antireflective coating is substantially amorphous.
- With respect to claim 47, Yoshikawa et al (figs 15-17) teaches the openings in the photoresist and the antireflective coating (21, fig 17) are formed by solvent processing of the photoresist (figs 15 & 12, col 5 lines 12 and 13) after the exposing to form the photoresist openings, followed by dry etching of the antireflective coating (22, figs 16-17, col 5 lines 37-40) through the photoresist openings.
- With respect to claim 48, Yoshikawa et al (figs 14-17) teaches forming the openings in the antireflective coating comprises after said exposing (figs 14-15: after the photoresist 3 is exposed by the light 6 from the Hg lamp), exposing the antireflective

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coating through the photoresist to radiation having a wavelength from about 190 nanometers to about 450 nanometers (figs 14-15: after the photoresist 3 is exposed by the light 6 from the Hg lamp, the antireflective coating 2 is also exposed to the radiation of light 6 from Hg lamp; since light 6 is from the Hg lamp, light 6 has a wavelength from about 190-450 nm; therefore, the antireflective coating 2 is also exposed to the radiation having a wavelength from about 190 nanometers to about 450 nanometers), and thereafter dry etching the antireflective coating (21/22) in an oxygen comprising ambient (col 3 lines 52-56).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 42 and 44-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshikawa et al [US 4,320,191].

With respect to claim 42 and 44-46, the claimed percentages of Ge and Se in the antireflective coating 2 of Yoshikawa et al is, therefore, considered to involve routine optimization while has been held to be within the level of ordinary skill in the art. As noted in In re Aller 105 USPQ233, 255 (CCPA 1995), the selection of reaction parameters such as temperature and concentration would have been obvious.

"Normally, it is to be expected that a change in temperature, or in concentration, or in both, would be an unpatentable modification. Under some circumstances, however, changes such as these may be impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely degree from the results of the prior art...such ranges are termed "critical ranges and the applicant has the burden of proving such criticality... More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation."

See also In re Waite 77 USPQ 586 (CCPA 1948); In re Scherl 70 USPQ 204 (CCPA 1946); In re Irmischer 66 USPQ 314 (CCPA 1945); In re Norman 66 USPQ 308 (CCPA 1945); In re Swenson 56 USPQ 372 (CCPA 1942); In re Sola 25 USPQ 433 (CCPA 1935); In re Dreyfus 24 USPQ 52 (CCPA 1934).

Allowable Subject Matter

5. Claim 39 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

6. The following is a statement of reasons for the indication of allowable subject matter: Recorded Prior Art fails to disclose or suggest the combination of process steps of semiconductor processing method recited in the base claim 36 wherein the single

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etching chemistry is dry and comprising exposure to an oxygen plasma containing atmosphere as characteristics in claim 39.


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanhha Pham whose telephone number is (571) 272-1696. The examiner can normally be reached on Monday and Thursday 9:00AM - 9:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Thanhha Pham.


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